REMARKS

Claims 1 to 15 are all the claims pending in the application.

The Examiner has objected to claim 2 because of the use of the word "means." The Examiner states that this word should be replaced with the word "is." Applicant has amended claim 2 as proposed by the Examiner.

Claims 1-5, 7-9, 11-13 and 15 have been rejected under 35 U.S.C. § 102(b) as anticipated by JP A-5 339490.

Applicant submits that JP '490 does not disclose or render obvious the presently claimed invention and, accordingly, requests withdrawal of this rejection.

The present invention as set forth in claim 1 is directed to a curable composition comprising a reactive silicon group containing polymer, a filler (C) and a curing catalyst (D). The reactive silicon group-containing polyoxyalkylene polymer is obtained by reacting a polyoxyalkylene polymer (A) having a molecular weight distribution of 1.6 or less, a number average molecular weight of 15,000 to 50,000, and 0.8 or more reactive groups, on average, per molecule thereof with an organic compound (B) having in the molecule thereof a reactive silicon group and a functional group capable of reacting with the reactive groups of the polymer (A) in a proportion of 0.8 to 1.5 molecules of the organic compound (B), on average, per molecule of the component (A).

As described in the background art section of the present specification, an object of the present invention is to provide a sealing material wherein staining around sealing joints can be suppressed.

As one of the causes for staining around joints, the bleeding of plasticizers contained in the sealants may be cited. If the plasticizers are removed, these problems can be solved. Therefore, there is an assumption that plasticizers are not used or are used at a less amount in the present invention.

However, there arise two problems if plasticizers are removed. Firstly, the workability becomes low due to the high viscosity before curing. Secondly, elasticity and elongation which are needed for a sealant become low due to hardness after curing. See page 2, lines 5-9, of the present specification.

The first problem can be solved by using a base polymer having a low viscosity, namely, a base polymer having a narrow molecular weight distribution. By the way, in order to decrease only viscosity, it is possible to decrease the molecular weight of the polymer. But in the case of employing a polymer having a low molecular weight without a plasticizer, flexibility after curing is low and sufficient elongation as a sealant cannot be attained. Therefore, the effects that viscosity before curing is low and elongation after curing is sufficient in a composition wherein plasticizers are not used or are used at a less amount can be affected in the present invention by using a polymer having high molecular weight and a narrow molecular weight distribution.

The second problem can be solved by decreasing the number of reactive silicone groups in the polymer. If the number of reactive silicone groups in the polymer is small, the cross-linking density becomes low after curing and a comparatively flexible cured product can be obtained. However, if the number of reactive silicone groups is decreased, a polymer wherein no reactive silicone group is stochastically introduced is formed.

When a polymer having one reactive silicone group on average per one molecule is synthesized, one group cannot be necessarily introduced into all polymer molecules. The resultant polymer becomes a mixture comprising polymers wherein 2, 1 or no reactive silicon groups are introduced. Since a polymer wherein no reactive silicon group is introduced functions as a cause for staining around joints, similar to a plasticizer (see page 5, lines 9-18 of the present specification), it is preferable that the amount of the polymer wherein no reactive silicon group is introduced is small.

Therefore, as stated above, the present invention as set forth in claim 1 is largely characterized in (1) a molecular weight distribution of 1.6 or less of the polymer (A), (2) 0.8 or more reactive groups, on average, per molecule thereof of the polymer (A), (3) in a proportion of 0.8 to 1.5 molecules of the organic compound (B), on average, per molecule of the component (A).

When the proportion is less than 0.8 molecule, the amount of the polyoxyalkylene polymers, having no reactive silicon group introduced thereinto and providing the cause for staining, is increased, while when the proportion exceeds 1.5 molecules, the cured product obtained unpreferably exhibits high modulus and low elongation. See page 21, lines 19-25, of the present specification.

The effects of the present invention are explained in the working examples in the present specification.

The present invention is explained in further detail by referring to the following illustrative example.

When polypropylene glycol (PPG) having OH groups at both ends as a raw material is allylated, a mixture is formed, the mixture being component (A) of the present invention, which mixture comprises (a) a polymer which is not allylated at all, (b) a polymer which is allylated at one end, and (c) a polymer which is allylated at both ends. In the present invention, the mixture has 0.8 or more reactive groups on average.

Then, component (A), comprised of the mixture (a), (b) and (c), is reacted with component (B) to introduce a reactive silyl group and form a mixture, referred to herein as mixture (G) for purposes of illustration, comprised of (a1) a polymer which is not silylated at all, (b1) a polymer which is silylated at one end, and (c1) a polymer which is silylated at both ends. In the present invention, the mixture (G) has 0.8 to 1.5 reactive silyl groups on average. The composition of the present invention surely has a polymer, which is fully silylated (the number of reactive silyl groups is two), but, as discussed above, it is not preferable that the entire polymer is fully silylated.

JP '490 is directed to a curable composition that contains a silyl group-containing poly oxyalkylene based polymer and a polyether monool having a specific molecular weight distribution as a plasticizer.

In the Examples of JP '490, both ends of a polyoxyalkylene polymer A are converted into allyl groups, and then the allyl groups are converted into a methyl dimethoysilylpropyl group. The entire polymer in JP '490 is fully silylated, and the number of reactive silyl groups becomes about 2. JP '490 discloses in paragraph [0024], which is referred to by the Examiner, that a silylation rate of 50% or more is contemplated. But the silylation rate in JP '490 is described

with a broad range, and partial silylation is not actively proposed. See Comparative Examples 1-3 of the present specification for silylations that are outside the scope of the present invention. These Comparative Examples did not achieve the results of the present invention.

In view of the above, applicant submits that JP '490 does not disclose or suggest the subject matter of claim 1 and, accordingly, requests withdrawal of this rejection.

Claims 1-5, 7-9, 11-13 and 15 have been rejected under 35 U.S.C. § 102(e) as anticipated by U.S. Patent Application Publication No. 2004/0188016 to Mahdi et al.

Applicant submits that Mahdi et al do not disclose or render obvious the subject matter of the present claims and, accordingly, request withdrawal of this rejection.

In Example 8 of Mahdi et al, which the Examiner has referred to, a polypropylene glycol diol (PPG) having a hydroxyl equivalent molecular weight of 6100 was used as a raw material, and 0.409 eq of isocyanate silane was reacted with 0.388 eq (=2366.2g/6100) of OH group. The equivalent of the polymer was calculated based on one OH group. That is, PPG has two OH groups and both OH groups were fully silylated (the number of reactive silyl groups is 2), since a sufficient amount of isocyanate silane per one OH group was used in the reaction.

Thus, the PPG in Mahdi et al does not satisfy the requirement of claim 1 of 0.8 to 1.5 reactive silyl groups on average.

Also, the molecular weight of PPG in Mahdi et al is twice 6,100, namely, 12,200. This weight does not satisfy the requirement in claim 1 of a molecular weight of at least 15,000.

In view of the above, applicant submits that Mahdi et al do not disclose or suggest the subject matter of claim 1 and, accordingly, requests withdrawal of this rejection.

The Examiner has stated that U.S. Patent No. 7,115,695 to Okamoto et al and U.S. Patent No. 6,569,980 to Masaoka et al appear to anticipate at least some of the present claims.

The Examiner has not rejected the claims based on either Okamoto et al or Masaoka et al, but since the Examiner has stated they anticipate at least some claims, applicant sets forth the following comments to show that these documents do not anticipate the present claims.

Okamoto et al do not contain a clear description about the number of reactive silyl groups. In Example 5 of Okamoto et al, the commercial product S203 is used. The product S203 is made by the assignee of the present application. In the case of S203, a polyoxyalkylene polymer having reactive allyl groups, which does not satisfy the requirements of molecular weight and distribution thereof of claim 1, is reacted with DMS as the (B) component to prepare S203. Thus, S203 does not become a polymer satisfying the requirements of claim 1.

Accordingly, Okamoto et al do not disclose or suggest the subject matter of claim 1.

Masaoka et al disclose that the number of reactive silyl group is at least 1, preferably 1.1 to 5, but the silylation rate is described with a broad range, and partial silylation is not actively proposed.

In Production Example 1 of Masaoka et al, PPG is prepared by a jump method, a double metal cyanide (DMCN) catalyst is not used in the process, and as a result the molecular weight distribution becomes more than 1.6. Masaoka et al disclose that the molecular weight in Production Example 1 is only 11,000. This molecular weight does not satisfy the requirement of claim 1 of a molecular weight of at least 15,000.

In Example 1 of Masaoka et al, it is described that a polymer is obtained by the process of Synthesis Example 1 in WO 91/13928. Applicants are submitting concurrently herewith an Information Disclosure Statement citing WO 91/13928, and corresponding English-language Canadian Patent Document CA 2,050,899. As can be seen in Synthesis Example 1 of WO '928, polyoxypropylene triol is used in WO 91/13928. Moreover, if the silylation reaction in Synthesis Example 1 of WO '928 proceeds at a ratio of 100%, the number of reactive silyl groups becomes 2.7 ((0.059eq/0.065eq) x 3). Thus, the polymer in Synthesis Example 1 of WO '928 does not satisfy the requirement of claim 1 of the number of reactive silyl group of 0.8 to 1.5.

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,

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